

4.5 HYDROLOGY, WATER RESOURCES, AND WATER QUALITY

This section addresses potential impacts on marine and freshwater hydrology, water resources, and water quality resulting from recommissioning PRC 421. The environmental setting focuses on the most relevant characteristics of existing marine and onshore water resources in the Project vicinity. Issues such as offshore currents, wave action and marine and freshwater quality are important in understanding the effects of a possible accidental release of oil or other hazardous materials on these resources. The impact analysis evaluates the potential effects of the proposed Project and Alternatives, including cumulative impacts, and identifies potential MMs. This section does not address water use as the Project would only have one time limited fresh water use for pipeline flushing.

This section relies on information from various State and Federal agencies including the National Oceanic and the Atmospheric Administration (NOAA), SWRCB, Santa Barbara County, and Scripps Institute of Oceanography.

4.5.1 Environmental Setting

Marine Environment

Regional Oceanographic Processes

The Project site is located along the landward edge of Santa Barbara Channel, near the western edge of the city of Goleta, along an area known as the Ellwood Coast. The major currents in the vicinity of the proposed Project include the California Current, which dominates, and the Southern California countercurrent that flows northward along the continental shelf (Figure 4.5-1). The California Current is an eastern-boundary current that flows south, carrying cool, nutrient-rich water from the sub-arctic region of the Pacific (DiGiacamo et al. 1995). Waters in the California Current are characterized by seasonably stable, low salinity (32 to 34 parts per thousand [ppt]), low temperature (55 to 68 °F), and high nutrient concentrations (Figure 4.5-1). The Southern California countercurrent carries warm, saline, and less oxygenated waters from Baja California into the Channel. Typically, winds blow from the northwest, parallel to the central California coast. The Southern California countercurrent is strongest when these winds relax between the months of December and February. When the winds gain strength between March and June, the Southern California countercurrent relaxes and surface water near the coast is transported offshore and down the coast and replaced by cooler, nutrient-rich seawater from underneath. This process is referred to as upwelling.

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FIGURE 4.5-1. OCEAN CURRENT SYSTEM IN THE PROJECT VICINITY

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1 *Surface and Subsurface Flows in the Santa Barbara Channel*

2 The mean flows of surface waters within the Channel are counter-clockwise and
3 monthly average flows reach 3 knots (nautical miles per hour) during most of the year
4 (Winnant et al. 1999). However, currents and surface transport are highly complex
5 within the Channel and are affected by periodic winds, coastal promontories, and
6 subsurface bathymetric features. Subsurface currents are important in determining the
7 fate of oil and other contaminants that may be released. Average monthly current
8 profiles in the Channel are often strongly sheared and rotate in a counter-clockwise
9 direction as depth increases. Average flow speed of subsurface flows increase with
10 depth throughout the majority of the year. The exception is during the late fall when the
11 surface flows intensify and become comparable to the speed of subsurface flows (CSLC
12 2006; NOAA 2005).

13 *Local Wave Action*

14 Waves generated on the surface of the ocean develop from a mixture of remotely
15 generated ocean swells and local winds. Due to the presence of the Channel Islands
16 off the coast, the Santa Barbara Channel is comparatively sheltered from swells
17 generated outside the Channel, which impedes the local generation of waves of
18 significant height. Consequently, wave heights within the Channel are typically low,
19 generally ranging from three to six feet throughout most of the year. Waves are
20 typically larger during winter storms that encroach on the California coastline from the
21 west, although the coastline is sheltered from North Pacific swells by Point Conception
22 (CSLC 2006). However, large swells from winter and fall storms occasionally penetrate
23 into the Channel and create very high surf conditions along the coast. For example, El
24 Niño conditions in 1983 generated very large surf, which combined with exceptionally
25 high tides to cause extensive damage along normally calm sections of the coastline
26 within the Channel. More recently, storms in the winter of 2005 to 2006 generated very
27 high surf along the Goleta coast, with wave heights exceeding 15 feet at exposed point
28 breaks (NOAA 2005).

29 Waves land on the mainland shore of the Channel at a slightly oblique angle, generally
30 from the west. This drives a long-shore current toward the east within the surf zone
31 (Hickey 1993). As a result, the net transport of particulates suspended in the water
32 column near shore is toward the east, in contrast to the typically westward transport that
33 is observed farther offshore.

1 *Marine Water Quality*

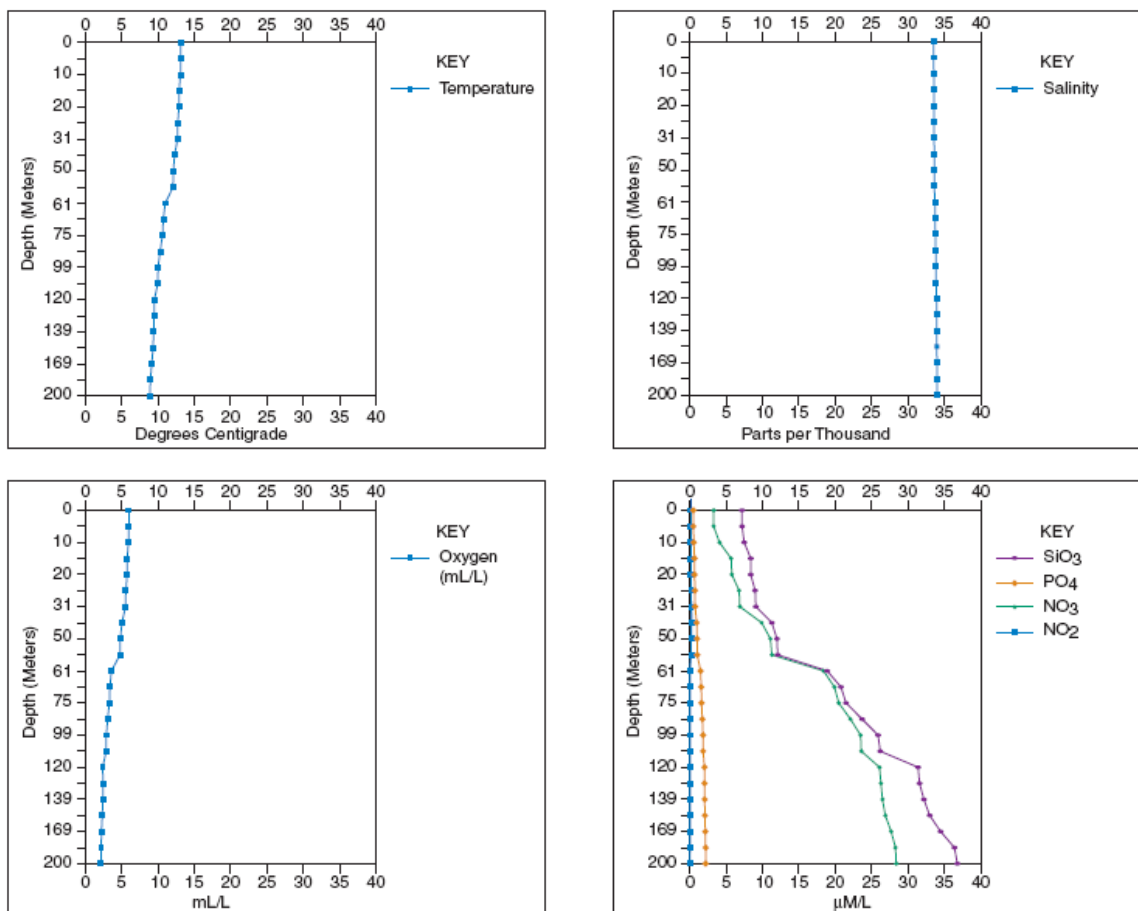
2 Marine water quality is affected by a number of factors including oceanographic
3 processes, contaminant discharge, erosion, and freshwater inflow. Petroleum
4 development activities, commercial and recreational vessels, natural hydrocarbon
5 seeps, river runoff, municipal wastewater outfalls, and minor industrial outfalls contribute
6 to the increased presence of nutrients, trace metals, synthetic organic contaminants,
7 and pathogens in ocean waters and sediments.

8 The presence and transport of nutrients, trace metals, and other contaminants in marine
9 water affects and is affected by five seawater properties: temperature, salinity, turbidity,
10 alkalinity, and dissolved oxygen. Vertical profiles of water quality properties measured
11 in the Channel between 1999 and 2001 are displayed in Figure 4.5-2.

12 The vertical density structure or stratification (determined by temperature and salinity at
13 increasing depths within the water column) determines the amount of vertical mixing
14 that occurs within the water column. Highly stratified waters inhibit vertical mixing of
15 water, nutrients, and contaminants. Therefore, a contaminant introduced by a point
16 source (e.g., a leak in a pipeline at a specific depth) would remain within the water
17 column and would not rapidly rise to the ocean surface or sink into the bottom
18 sediments. In the winter and spring, the Channel is characterized by cold, high nutrient
19 surface water, and a shallow thermocline (i.e., highly stratified). In the summer and fall
20 the Channel is characterized by warm, low nutrient surface water, and a deep
21 thermocline (i.e., highly mixed) (Santa Barbara Long-Term Ecological Research
22 Program 2003).

23 Within the mixed surface waters, dissolved oxygen levels are uniformly high and near
24 saturation. This layer is known as the euphotic zone due to the penetration of light in
25 this zone. Correspondingly, nitrate and phosphate are depleted in the surface mixed
26 layer due to uptake by primary production (phytoplankton blooms) in the euphotic zone.
27 Wind-driven upwelling, which periodically replenishes surface waters with nutrient-rich
28 water from below, is an important feature of the Channel and is largely responsible for
29 its productive fishery. The presence of nutrient-rich water (high levels of nitrates and
30 phosphates) near the sea surface significantly enhances primary productivity. Below
31 the surface, oxygen concentrations steadily decrease with depth due to losses from
32 respiration and decomposition (CSLC 2006). Turbidity in the euphotic zone is
33 determined by the concentration of suspended particulate matter (PM) near the sea
34 surface. Turbidity is increased in coastal waters as a result of storm runoff, sediment
35 re-suspension, discharge of wastewater, and phytoplankton blooms.

FIGURE 4.5-2. VERTICAL PROFILES OF WATER QUALITY PROPERTIES IN THE SANTA BARBARA CHANNEL



Source: Scripps Institute of Oceanography 2000.

Trace Metals

Ambient trace metal concentrations in the water column typically occur at levels below the detection limit of standard analytical methods. Therefore, in order to measure such contaminants in seawater, resident California mussels (*Mytilus californianus*) are used as indicator organisms to indirectly monitor water quality. Mussels accumulate contaminants directly from the seawater and ingested food. Measuring the level of concentrated contaminants in mussels in samples over specific periods of time provides a measure of the concentration of contaminants in the water column over time.

The State Mussel Watch Program (run by the SWRCB) has been monitoring the concentration of contaminants in mussels since 1971 and provides a long-term indication of the ambient level of trace metals along the California coast. There are no current regulatory standards regarding the level of trace metals in mussels or other

bivalves; therefore, the objective of the State Mussel Watch Program is to examine trends in trace metals along the coast of California and identify areas where spikes in certain metals occur (SWRCB 2004). No samples were collected at beaches in Goleta. The nearest sampling location to the Project site is the Santa Barbara Harbor. Concentrations at this location were higher than the average concentration of trace metal at all sampling locations in the Channel with the exception of silver, arsenic, nickel, and selenium.

Petroleum Hydrocarbons

Petroleum hydrocarbons are organic contaminants that enter the ocean both naturally and as the result of human error (i.e., oil spills). The principal sources of petroleum hydrocarbons in the Channel include:

- Urban runoff of road material, auto exhaust, lubricating oils, gasoline, diesel fuel, and tire particles;
- Produced-water discharges;
- Atmospheric deposition from the combustion of fossil fuels;
- Vessel leaks, spills, and exhaust;
- Leaching of creosote from wooden pilings;
- Oil and grease contained in municipal sewage effluent; and
- Natural oil seeps.

Natural seeps found along the coasts of Santa Barbara and Ventura counties discharge significant quantities of oil and tar to the near-shore waters of the Channel. Studies conducted in the late 1970s found that between 16,000 and 240,000 barrels of oil enter the Channel annually from natural seeps. Further, the Western States Petroleum Association estimates 150 to 170 barrels of oil seep from the sea floor near Coal Oil Point (approximately 5 miles southeast of the Project area) each day (Helix 2006). Consequently, the intertidal zone at Goleta, particularly along the Ellwood Coast in the Project vicinity, frequently experiences naturally occurring oil and tar from the Coal Oil Point Seep.

Generally, oil entering the ocean naturally through seeps does not severely degrade open ocean water quality. Oil spills cause the most degradation to water quality during and for a few weeks after each spill. Most components of crude oil are not soluble in

seawater and float on the sea surface; therefore, impacts to the water column are limited. In addition, aromatic hydrocarbons, such as benzene and toluene, which are considered the most toxic to marine life, evaporate quickly after a spill. Other weathering processes, such as spreading, dissolution, dispersion, emulsification, photochemical oxidation, and microbial degradation, decrease the volume of the oil slick and increase the viscosity (thickness) of the spilled oil. Consequently, mortality of marine organisms resulting from the physical effects of smothering and coating is the greatest concern. However, toxicological effects from exposure to aromatic hydrocarbons can be significant if unweathered oil reaches the shoreline, particularly in areas with rocky shorelines, enclosed embayments, estuaries, and wetlands. These impacts are discussed further in Section 4.6, Marine Biological Resources.

Aquatic Environment

Surface Water

Primary components of the proposed Project are situated in the surf zone, near shore areas and on low-lying coastal areas immediately inland from the beach. The nearest drainages to the Project area are Bell Canyon and Tecolote Creeks to the northwest and Devereux Creek to the southeast. Bell Canyon and Tecolote Creeks drain primarily rural and agricultural areas northwest of the urban areas of the city of Goleta and discharge into lagoons at the west of the Project site. Devereux Creek drains a largely urbanized watershed, which encompasses the western portions of the city of Goleta, and empties into the Devereux Slough located approximately 1.8 miles southeast of the Project area. Runoff from the inland portions of the Project site could potentially drain into Bell Canyon Creek (Figure 4.5-3).

Water Quality

The SWRCB has listed Bell Canyon Creek as impaired for nitrates under their 303d listing program (SWRCB 2006). Water quality sampling is performed during storm events in Bell Canyon, Tecolote, and Devereux Creeks as part of the countywide “Project Clean Water” program.

The most recent water quality analysis report that includes data for these creeks is for rain year 2001 to 2002. During this rain year, both Bell Canyon and Devereux Creeks exceeded the maximum contaminant standards for copper, mercury, and zinc. Tecolote Creek also exceeded the standard for copper and zinc, but not mercury. In addition, Bell Canyon and Tecolote Creeks exceeded the maximum diazinon standard and

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FIGURE 4.5-3. SURFACE WATER RESOURCES

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Devereux and Tecolote Creeks exceeded the maximum standard for chlorpyrifos. Tecolote Creek also exceeded the maximum standard for malathion. Oil and grease, and TPH were not detected in any of the samples for either of these creeks (Santa Barbara County 2002).

Water quality data was also collected during two prior rain years (1999 to 2000 and 2000 to 2001). Results for these years were similar to the more recent rain year. During the 2000-2001 rain year, both Bell Canyon and Devereux Creeks exceeded the standard for copper, mercury and zinc, while Tecolote Creek only exceeded the standard for copper and zinc. Similarly, all three creeks exceeded the standard for diazinon. In addition, Bell Canyon and Tecolote Creeks exceeded the standard for chlorpyrifos. Tecolote Creek also exceeded the standard for Malathion. Oil and grease and TPH were not detected in any of the samples for these creeks (Santa Barbara County 2001).

Water quality sampling during the 1999 to 2000 rain year detected oil and grease and TPH during one sampling event of Bell Canyon Creek. In addition, all three creeks exceeded the standard for copper, lead, and zinc. Bell Canyon Creek also exceeded the standards for arsenic, chromium, diazinon and malathion (Santa Barbara County 2000).

Groundwater

The Project area is adjacent to the West Subbasin of the Goleta Groundwater Basin. This underground reservoir is considered hydrologically separate from the North and Central Subbasins of the Goleta Groundwater Basin. Available storage in the West Basin is estimated to be 7,000 acre-feet (af). Based on the most recent analysis, the West Subbasin is in a state of surplus. However, water in this subbasin is considered poor quality and low yield, but is classified as beneficial use drinking water by the RWQCB under the Basin Plan. (Santa Barbara County 2005).

4.5.2 Regulatory Setting

Federal Regulations

Clean Water Act (33 U.S.C. ss/1251 et seq.)

The CWA established national water quality goals and the basic structure for regulating discharges of pollutants into the waters of the United States. The CWA also created a system of permits, called the National Pollutant Discharge Eliminant System (NPDES), which specified minimum standards for the quality of discharged waters. It required

states to establish standards specific to water bodies and designate the types of pollutants to be regulated, including total suspended solids and oil. The CWA authorized the U.S. EPA to issue the NPDES permits and/or approve State programs for the issuance of permits.

Under NPDES, all point sources that discharge directly into waterways are required to obtain a permit regulating their discharge. NPDES permits fall under the jurisdiction of the SWRCB when the discharge occurs within the 3-mile territorial limit.

Oil Pollution Act

The OPA of 1990 established a Federal system of liability and compensation for damages caused by oil spills in U.S. navigable waters. The Act requires removal of spilled oil and establishes a national system of planning for and responding to oil spill incidents. It includes provisions to:

- Improve oil-spill prevention, preparedness, and response capability;
- Establish limitations on liabilities for damages resulting from oil pollution;
- Provide funding for natural resource damage assessments;
- Implement a fund for the payment of compensation for such damages; and
- Establish an oil pollution research and development program.

The Secretary of Interior is responsible for spill prevention, oil-spill contingency plans, oil-spill containment and clean-up equipment, financial responsibility certification, and civil penalties for offshore facilities and associated pipelines in all Federal and State Waters. The U.S. Department of Homeland Security was designated by the USCG as the lead agency for offshore oil spill response, which includes responsibility for coordination of Federal responses to marine emergencies. The USCG is also responsible for enforcing vessel compliance with the OPA.

Marine Plastic Pollution Research and Control Act

This Act prohibits the discharge of plastic, garbage, and floating wood scraps within 3 nm (nautical miles) of land. Beyond 3 nm, garbage must be ground to less than one inch, but discharge of plastic and floating wood scraps is still restricted. This Act requires manned offshore platforms, drilling rigs, and support vessels operating under a Federal oil and gas lease to develop waste management plans and to post placards

1 reflecting discharge limitations and restrictions on plastics and other forms of solid
2 wastes. The USCG enforces these requirements.

3 *California Toxics Rule*

4 The U.S. EPA has promulgated water quality criteria for priority toxic pollutants for
5 California inland surface waters, enclosed bays, and estuaries. These criteria have
6 been adopted by the State and, together with State-adopted designated uses, satisfy
7 CWA requirements for the establishment of water quality standards for California
8 waters. The SWRCB adopted the "Policy for implementation of Toxics Standards for
9 Inland Surface Waters, Enclosed Bays, and Estuaries of California" in 2000.

10 *Marine Protection, Research, and Sanctuary Act*

11 In 1972, this Act established the National Marine Sanctuary Program, which is
12 administered by the NOAA of the Department of Commerce.

13 There are two Federal marine sanctuaries within the project study area: Channel
14 Islands National Marine Sanctuary (CINMS) and Monterey Bay National Marine
15 Sanctuary (MBNMS). The primary goal of these sanctuaries is the protection of the
16 natural and cultural resources contained within their boundaries.

17 Designated in 1980, the CINMS surrounds the four northern Channel Islands out to a
18 distance of six nm. Sanctuary regulations prohibit exploring for, developing, and
19 producing hydrocarbons within the CINMS, except pursuant to leases executed prior to
20 March 30, 1981, and except the laying of pipeline, provided specified oil spill
21 contingency equipment is available at the site of such operations. In 2003, regulations
22 went into effect that restrict fishing and other extractive uses in 10 marine reserves and
23 two conservation areas within the CINMS (CDFG 2001, CINMS 2001, and CDFG 2002).

24 The MBNMS, created in 1992, is located offshore of California's central coast.
25 Stretching from Marin to Cambria, the MBNMS encompasses a shoreline length of
26 276 miles and 5,322 square miles of ocean, extending an average distance of 30 miles
27 from shore. As such, the northern barge transport route passes through portions of the
28 MBNMS en route to San Francisco. Within the boundaries of the sanctuary are the
29 nation's largest kelp forests, one of North America's largest underwater canyons, and
30 the closest-to-shore deep ocean environment in the continental United States. The
31 MBNMS is also home to one of the most diverse marine ecosystems in the world,
32 including 33 species of marine mammals, 94 species of seabirds, 345 species of fishes,
33 and numerous invertebrates and plants.

1 State Regulations

2 *California Water Code*

3 Section 13142.5 of the California Water Code provides marine water quality policies
4 stating that wastewater discharges shall be treated to protect present and future
5 beneficial uses, and, where feasible, to restore past beneficial uses of the receiving
6 waters. The highest priority is given to improving or eliminating discharges that
7 adversely affect wetlands, estuaries, and other biologically sensitive sites; areas
8 important for water contact sports; areas that produce shellfish for human consumption;
9 and ocean areas subject to massive waste discharge.

10 *Porter-Cologne Water Quality Control Act*

11 The Porter-Cologne Water Quality Control Act provides a comprehensive water quality
12 management system for the protection of California waters and regulates the discharge
13 of oil into navigable waters by imposing civil penalties and damages for negligent or
14 intentional oil spills. Under this Act “any person discharging waste, or proposing to
15 discharge waste, within any region that could affect the quality of the waters of the
16 State” must file a report of the discharge with the appropriate RWQCB. Pursuant to the
17 Act, the RWQCB may then prescribe waste discharge requirements that add conditions
18 related to control of the discharge. The Act defines waste broadly, and the term has
19 been applied to a diverse array of materials, including non-point source pollution.

20 The Porter-Cologne Water Quality Control Act is also the primary State legislation
21 addressing water quality and waste discharges on land. Permitted discharges must be
22 in compliance with the regional Water Quality Control Plan (Basin Plan) that was
23 developed for their region. Each RWQCB implements the Basin Plan to ensure that
24 projects consider regional beneficial uses, water quality objectives, and water quality
25 problems. The Central Coast RWQCB maintains jurisdiction over the proposed Project
26 area.

27 *California Harbors and Navigation Code*

28 The California Harbors and Navigation Code regulates discharges from vessels within
29 territorial waters. One of its purposes is to prevent vessel discharges from adversely
30 affecting the marine environment. Section 151 of the Code regulates oil discharges and
31 imposes civil penalties and liability for cleanup costs when oil is intentionally or
32 negligently deposited on the waters of the State of California.

1 *California Ocean Plan*

2 Section 13170.2 of the California Water Code directs the SWRCB to formulate and
3 adopt a water quality control plan for the ocean waters of California. The SWRCB first
4 adopted this plan, known as the *California Ocean Plan*, in 1972. The California Water
5 Code also requires a review of the plan at least every three years to ensure that current
6 standards are adequate and are not allowing degradation to indigenous marine species
7 or posing a threat to human health. The amendments to the *California Ocean Plan* are
8 reviewed and approved by the U.S. EPA under the CWA. The most recent update of
9 the *California Ocean Plan* was completed in 2005.

10 The *California Ocean Plan* establishes water quality objectives for California's ocean
11 waters and provides the basis for regulation of wastes discharged into the State's
12 coastal waters. The plan applies to both point and non-point sources. In addition, the
13 *California Ocean Plan* identifies applicable beneficial uses of marine waters and sets
14 narrative and numerical water quality objectives to protect beneficial uses (Table 4.5-1).

15 *California Coastal Act*

16 The California Coastal Act is the principal planning and regulatory program for the
17 coastal zone of California. It governs a variety of actions and activities that affect the
18 shoreline throughout the State. Specifically, the Act protects coastal access,
19 environmentally sensitive habitats, agricultural lands, fisheries, cultural resources, and
20 scenic qualities of the shoreline. The Act also establishes guidelines for development in
21 the coastal zone and contains provisions for protecting life and property from coastal
22 hazards. The Act also addresses surface waters including flood hazards and
23 disturbances, maintenance of biological productivity in surface waters, and potential
24 impacts from runoff. The California Coastal Act is implemented through Local Coastal
25 Programs developed and adopted by county and city jurisdictions as well as other State
26 agencies that own land in the coastal zone.

27 Local Regulations

28 *Water Quality Control Plan*

29 The Central Coast RWQCB has established a Basin Plan for the coastal watersheds of
30 San Luis Obispo, Santa Barbara, and Monterey counties under the authority of the
31 Porter-Cologne Water Quality Control Act. The Basin Plan defines beneficial uses of
32 coastal watersheds and sets water quality objectives for priority pollutants in order to
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Table 4.5-1. California Ocean Plan Water Quality Standards Relevant to the Project¹

B. PHYSICAL CHARACTERISTICS	
1.	Floating particulates and grease and oil shall not be visible.
2.	The discharge of the waste shall not cause aesthetically undesirable discoloration of the ocean surface.
3.	Natural light shall not be significantly reduced at any point outside the initial dilution zone as a result of the discharge of waste.
4.	The rate of deposition of inert solids and the characteristics of inert solids in ocean sediments shall not be changed such that benthic communities are degraded.
C. CHEMICAL CHARACTERISTICS	
1.	The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from which occurs naturally, as a result of the discharge of oxygen demanding waste materials.
2.	The pH shall not be changed at any time more than 0.2 units from that which occurs naturally.
3.	The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above that present under natural conditions.
4.	The concentration of substances set forth in Chapter IV, Table B in marine sediments shall not be increased to levels which would degrade indigenous biota.
5.	The concentration of organic materials in marine sediments shall not be increased to levels which would degrade marine life.
6.	Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota.
D. BIOLOGICAL CHARACTERISTICS	
1.	Marine communities, including vertebrate, invertebrate and plant species, shall not be degraded.
2.	The natural taste, odor and color of fish, shellfish, or other marine resources used for human consumption shall not be altered.
3.	The concentration of organic materials in fish, shellfish or other marine resources used for human consumption shall not be bioaccumulated to levels that are harmful to human health.

¹ California Ocean Plan Standards A, Bacterial Characteristics do not apply to proposed Project.

maintain beneficial uses. The RWQCB implements the Basin Plan by issuing and enforcing waste discharge requirements to individuals, communities, or businesses whose waste discharges can affect water quality. These requirements can be either State Waste Discharge Requirements for discharges to land, or federally delegated NPDES permits for discharges to surface water.

Project Clean Water

The Santa Barbara County Water Agency, Project Clean Water was established to reduce or eliminate discharges of pollution into creeks, rivers, ponds, or ocean waters, through implementation of NPDES permit requirements and applicable regulations. This agency completes storm water sampling at select locations throughout the county. The County Water Agency is currently in the process of adopting provisions of the Storm Water Phase II Final Rule, which requires the operator of a regulated small

municipal separate storm sewer system (MS4) to obtain NPDES permit coverage because discharges of storm water from such systems are considered point sources.

UCSB Long Range Development Plan

The 1990 UCSB Long Range Development Plan (LRDP) was established to identify the physical development necessary to achieve the Campus' academic goals and provide a land use plan to guide the development of future facilities. The LRDP is also intended to respond to the provisions of the California Coastal Act of 1976, with respect to the preparation of Long Range Development Plans for Campuses in the Coastal Zone. The LRDP includes guidance for storm water management and recommends the use of integrated storm water management practices to reduce and control runoff and sources of pollution in § 30230.10.

City of Goleta General Plan/Coastal Land Use Plan (GP/CLUP)

The City of Goleta GP/CLUP was adopted by the city in November 2006. The GP/CLUP adopted as part of its plan the policies of the California Coastal Act. In addition, the GP/CLUP contains a number of other policies that are relevant to the proposed Project. These are described below:

- Land Use Policy 10.4(b) – If resumption of production is considered for approval for PRC 421, on-pier processing of the oil at a site within the tidal zone should not be approved unless it is demonstrated that there is no feasible and less environmentally damaging alternative to processing on the pier. The development of new processing facilities over the sea would result in an increased level of risk of environmental damage.
- Policy CE 2 – Preserve, restore, and enhance the physical and biological integrity of Goleta's creeks and natural drainages and their associated riparian and creekside habitats.
- Conservation Guiding Principle 5 – Protect water quality and the biological diversity of Goleta Slough and Devereux Slough.
- Conservation Guiding Principle 9 – Manage water resources at the watershed level cooperatively with other agencies to maintain high groundwater and surface water quality and to protect marine aquatic habitats.
- Policy CE 6 – Preserve and protect the biological integrity of marine habitats and resources within and adjacent to Goleta.

- Policy CE 10 – Manage groundwater and surface water resources to promote water quality and quantity adequate to support natural ecosystem processes and functions.

4.5.3 Significance Criteria

Impacts to water quality would be considered significant if:

- Contaminant concentrations within the Channel Islands National Marine Sanctuary (CINMS) or within Santa Barbara Channel coastal wetlands measurably increase relative to background concentrations;
- The water quality objectives contained in the Water Quality Control Plan for the Central Coast are violated;
- The water quality objectives contained in the California Ocean Plan are violated;
- The water quality criteria in the Proposed California Toxics Rule are violated;
- Project operations or discharges that change background levels of chemical and physical constituents or elevate turbidity producing long-term changes in the receiving environment of the site, area, or region, thereby impairing the beneficial uses of the receiving water occur; or
- Contaminant levels in the water column are increased to levels with the potential to cause harm to marine organisms even if the levels do not exceed formal objectives in the Water Quality Control Plan or *California Ocean Plan*.

4.5.4 Impacts Analysis and Mitigation

Impact Discussion

Erosion and sedimentation from short-term construction activities include trenching, replacement, and repair of the 6-inch pipeline beneath the existing access road and could adversely affect surface water quality in Bell Canyon Creek. However, impacts would be reduced through the employment of standard erosion and sediment control BMPs which would be outlined in the Erosion and Sediment Control Plan, required by the City of Goleta Grading Ordinance, including watering of disturbed soils, silt fences, and temporary sediment barriers. In addition, Venoco would be required to develop a SWPPP for construction activities and obtain a General Construction Permit from the SWRCB which would prevent contaminated runoff from the construction site, which could contain trace metals or small amounts of petroleum hydrocarbons, from entering Bell Canyon Creek. Further, as construction would last for approximately 45 days; impacts to surface water quality would be short-term and less than significant.

1 However, the proposed Project would increase the likelihood of an accidental release of
2 crude oil to the marine environment. Analyses of risk presented in Section 4.2, Safety,
3 indicate the possibility of a release of crude oil into the marine environment, including a
4 potential for undetected slow leaks. Resuming production at PRC 421 would also
5 increase the frequency of potential crude oil spills due to an increase in barge trips (see
6 Section 4.2, Safety). In addition, resuming production and prolonging the life of the
7 aging caissons could increase the potential for a release of contaminated sediment to
8 affect water quality (see Section 4.3, Hazardous Materials).

9 **Impact WQ-1: Temporary Construction Impacts to Marine Water Quality**

10 **Short-term construction (e.g., pile-driving) in the surf zone would adversely affect**
11 **marine water quality (Potentially Significant, Class II).**

12 The predominant environmental concern associated with pile driving is that potentially
13 contaminated sediments would be exposed or contaminants would be mobilized
14 through pore water movement to the biologically active zone or overlying water column.
15 While disturbance of sediment has the potential to result in increased suspended
16 sediments (turbidity) in the water column, these effects would be temporary (for the
17 duration of pile-driving activities) and confined to the immediate vicinity of the Project
18 area. Further, activity would occur within the active surf zone, a naturally turbid area
19 within the ocean environment. Proposed repair activities would disturb small amounts
20 of sand-sized sediments, which would be expected to settle rapidly and would not
21 create extensive turbidity plumes. Therefore, the potential increase in suspended
22 sediments during construction would result in a less than significant temporary impact.
23 In addition, drilling or pile driving for caisson repair could potentially release
24 contaminated mud and sand from the caissons and underlying soil into the ocean
25 environment. Repair activities conducted on the existing caissons at Well 421-1
26 detected two leaks in the caisson wall which were sampled for contaminants. Results of
27 chemical analyses performed on mud and sand within the caisson revealed the
28 presence of TPH at levels of 100 to 200 ppm. Tests for benzene, toluene,
29 ethylbenzene, xylenes, and short-chain hydrocarbons resulted in non-detectable results.
30 In addition, hydrocarbons were detected in the soil surrounding the piers at a depth of
31 15 feet below ground. Further, analytical sampling conducted in October 2006 on water
32 from the caissons detected trace amounts of arsenic, mercury, and selenium (although
33 all amounts were detected below water quality threshold levels and no action was
34 triggered). The potential release of hydrocarbon contaminated sand from subsurface
35 soil and rock soil into the surf-zone is considered a potentially significant impact, which

would be subject to feasible mitigation as discussed below. Implementation of the SPCC Plan and MMs outlined below would reduce potential impacts to less than significant levels.

Mitigation Measures

In addition to the implementation of MM HAZ-1a through HAZ-1d, the following MMs would apply.

MM WQ-1a. Silt Curtain. Prior to implementing in-water construction, a silt curtain shall be installed around the Project area to contain suspended sediments. Immediately following completion of in-water construction activities, sediments and water contained within the silt curtain shall be sampled for the presence of hydrocarbons and trace metals. Any potentially contaminated sediment which may be disturbed during pile-driving activities would be contained within the Project area for off-site disposal at an appropriate waste facility, and disposed of according to State and Federal regulation.

MM WQ-1b. Water Quality Certification. Venoco shall complete and implement a SPCC Plan and implement any additional MMs mandated by SWRCB through 401 water quality certification process.

Rationale for Mitigation

Implementation of MMs above and those mandated by the SWRCB would reduce potential water quality impacts to below State thresholds. Removal of contaminated sediments from construction zones prior to in-water construction activities (if possible without impairing the integrity of the pier) would prevent the release of petroleum hydrocarbons resulting from Project activities. Removal of contaminated sub-soil mobilized during drilling would prevent it from reaching the surf-zone. Erection of a silt curtain would reduce the dispersion of contaminated sediments from the soils surrounding the piers into the water column and prevent elevated turbidity levels within the active surf zone.

Impact WQ-2: Oil Spill Impacts to Marine Water Quality

Accidental discharge of petroleum hydrocarbons into marine waters would adversely affect marine water quality (Significant, Class I).

Upon implementation of the proposed Project, oil would be produced at Well 421-2, and separated from water and gas at Pier 421-2 (which is located in the surf zone). Up to at

1 least 2013, crude oil would be transported via Line 96 to the EMT and transferred to the
2 barge *Jovalan* for transport to refineries.

3 Production from Well 421-2 would be routed into a GLCS and hydrocyclone separator to
4 separate out water and gas from the produced oil. While safety systems and
5 emergency shut-down systems would be installed to prevent the accidental release of
6 oil from this well (see Section 2.4.4, PRC 421 Maintenance and Safety Systems), the
7 potential remains for a release of oil from PRC 421-2 during production from well casing
8 blow outs, potential wave or seismic damage to project facilities (caissons, seawall,
9 separators). The maximum amount of oil which could potentially be released during a
10 worst-case oil spill is 12.5 barrels (see Section 4.2, Safety).

11 Further, as stated in the Project Description, the number of barge calls at EMT would
12 increase as a result of the proposed Project by approximately five additional calls in the
13 first year, tapering off to two additional trips toward the end of the current EMT lease in
14 2013, when transport by barge would cease. The increased vessel traffic would
15 increase the risk of a vessel accident and an accidental spill. The northbound route of
16 barge *Jovalan* passes through the outer area of the MBNMS while the southbound route
17 passes through the Santa Barbara Channel and the CINMS. The potential for an
18 accidental spill during transit would increase with the number of vessel calls.

19 The production of oil at Well 421-2 (and the offshore separation process) and the
20 transport of oil on barge *Jovalan* have the potential for accidental discharge of
21 petroleum hydrocarbons into surface waters. See Section 4.2, Safety for a full
22 discussion of spill potential and quantities.

23 A large spill would meet all of the threshold criteria for a significant water quality impact.
24 A large crude oil spill would introduce hydrocarbon contaminants that are persistent,
25 would extend well beyond the Project area, would impact the marine ecosystem, and
26 would measurably depart from background concentrations. Therefore, impacts to
27 marine water quality from a large crude oil spill would be considered potentially
28 significant (for the definition of a large spill see Section 4.2, Safety).

29 Spilled oil results in several impacts to marine water quality explicitly addressed in the
30 *California Ocean Plan* (Table 4.5-1). Surface slicks limit equilibrium exchange of gases
31 at the ocean-atmosphere interface. This reduces near-surface oxygen concentrations,
32 particularly with the increased biochemical oxygen demand of crude-oil emulsions. As
33 the seawater-oil emulsion mixes into the water column, turbidity would increase and
34 toxic hydrocarbons would be released into the water column and seafloor sediments.

1 Weathering can widely disperse tar balls, which may eventually be ingested by pelagic
2 and benthic biota, with adverse effects. Although a surface slick can disperse within a
3 few hours of a spill in harsh sea conditions, lingering effects could persist for much
4 longer periods. For example, it took approximately two years for mussel tissue burdens
5 of aromatic hydrocarbons to return to background levels after the Exxon Valdez Oil Spill
6 (Boehm et al. 1995). Although this spill was several magnitudes larger than any spill
7 possible under implementation of the proposed Project, monitoring results indicate the
8 potential for long-term effects. The increased potential for accidental discharges of
9 petroleum hydrocarbons into marine waters are considered a significant (Class I) impact
10 because there is an increased likelihood of a large oil spill as a result of the proposed
11 Project and because such a spill would result in tangible damage to marine water
12 quality in excess of concentrations identified in regulatory criteria.

13 Mitigation Measures

14 **MM WQ-2a.** Implement MMs described in Section 4.2, Safety.

15 Rationale for Mitigation

16 Implementation of these MMs would reduce the probability of an oil spill and the
17 resulting consequences to the marine environment. The identified measures would
18 enhance planning and preparedness to respond to the oil spill and would reduce both
19 the potential oil spill size and the potential for oil spills. The measures would also
20 increase the effectiveness of an oil spill cleanup effort.

21 Residual Impact

22 Marine water quality impacts associated with accidental oil spills are categorized as
23 significant because the proposed MMs would not be completely effective in reducing the
24 significant risk of a spill, nor would they adequately eliminate the significant effect of a
25 spill on marine resources. A large spill (see definition in Section 4.2, Safety) would
26 violate many water quality regulations and have a deleterious effect on the marine
27 environment and biota. It would generate visible surface sheens, significantly reduce
28 the penetration of natural light, reduce dissolved oxygen, degrade indigenous biota, and
29 result in hydrocarbon contamination within the water column and marine sediments.
30 The duration and area of the impact would be largely dictated by the size and location of
31 the spill, and the various physical conditions of the sea at the time of the spill. Impacts
32 would last from days to weeks and extend for tens of miles.

Mitigation of water quality impacts from a major marine oil spill is largely a function of the efficacy of the spill response measures. The effectiveness of spill cleanup measures is dependent on the response time, availability and type of equipment, size of the spill, and the weather and sea state during the spill. Only some of these aspects are within the control of the spill response team. In addition, many oil spill response measures, such as dispersants, have impacts of their own.

Under the regulatory-based significance criteria described in Section 4.5.3, Significance Criteria, even small oil spills could potentially be significant. Many regulations and guidelines establish limits based on the presence of a visible sheen on the ocean surface. This criterion is reflected in the static sheen test for free oil identified in the NPDES General Permit, USCG regulations, and the aesthetic criterion C.1 in the Ocean Plan Standards (see Table 4.5-1). Therefore, even with the imposition of the MMs, this impact remains significant (Class I).

Impact WQ-3: Oil Spill Impacts to Surface Water Quality

Accidental discharge of petroleum hydrocarbons into adjacent surface waters would adversely affect surface water quality (Significant, Class I).

Separated oil from Well 421-2 would be transported via pipeline to the EMT for transport to refineries in Los Angeles and San Francisco Bay. Accidental spills from Well 421-2 and associated separation-processing equipment, facility pipelines or from the barge Jovalan have the potential to impact area surface and groundwater resources.

The current pipeline is located approximately 200 feet east of Bell Canyon Creek. Safety measures for the pipeline include the insertion of 2-inch flowlines within the existing 6-inch pipeline. In the event of a leak in the 2-inch flowline oil would be contained within the 6-inch pipeline. Upon detection of liquid in the 6-inch pipeline the well pump would be completely shut in. It is estimated that shut in would be complete within 15 seconds of leak detection. A leak detection sensor would also be provided within the 6-inch pipeline and if a leak were detected shut in would also automatically occur. The potential exists, however slight, for oil to be released from the pipeline during the 15-second interval prior to shut in of the pump and in the time before the leak would be detected. The amount of oil which could potentially be released into the environment during this period of time is dependent on the size of the leak in the pipeline.

1 Risk analyses conducted for the probability of a leak in Line 96 concluded that there is a
2 low probability over the approximate 12-year lifetime of the Project that a small leak may
3 occur (see Section 4.2, Safety). The risk analyses conducted on Line 96 concluded that
4 there is a 6.2-percent probability that a significant rupture in the pipeline would occur
5 over a 12-year period.

6 In addition, as described above in WQ-1, the proposed Project has the potential to
7 release petroleum hydrocarbons into the marine environment within Santa Barbara
8 Channel. Devereux Creek and its mouth (Devereux Slough) are located approximately
9 1 mile southeast of the proposed Project site. Devereux Slough is part of the University
10 of California Reserve System and is a protected wetland which provides habitat and
11 nesting area for numerous shorebirds and migrating birds (see Section 4.6, Marine
12 Biological Resources and Section 4.7, Terrestrial Biological Resources). The potential
13 exists for petroleum hydrocarbons from a spill resulting from transport on the barge
14 Jovalan to enter the Devereux Slough, particularly on high surf days when greater
15 amounts of ocean water enter the Slough. A large crude oil spill could introduce
16 petroleum hydrocarbon contaminants above background concentrations into the slough
17 (see Section 4.2, Safety) and impact the aquatic environment. Therefore, a large crude
18 oil spill into surface water resources near the Project site could exceed stated
19 significance thresholds (California Toxics Rule, Ocean Plan, and the Basin Plan) and
20 would be potentially significant.

21 Oil from a surface spill would disperse and weathering would, in turn, affect the long-
22 term persistence and toxicity of oil. Further, the soluble and more toxic components of
23 crude oil (e.g., benzenes and other lower molecular weight aromatic compounds), would
24 volatilize and dissipate naturally from the environment. Consequently, the toxicity of a
25 potential spill may be reduced somewhat by natural weathering processes during
26 dispersion. However, insoluble oil fractions could potentially settle in bottom sediments
27 or get trapped by aquatic vegetation and affect water quality for several years. This is
28 more likely to occur in Devereux Slough than Bell Canyon Creek as the current flows
29 from west to east and Bell Canyon Creek is located west of the Project. Further, oil
30 spills to Bell Canyon Creek would be near the mouth of the creek and spilled oil would
31 likely disperse quickly into the Pacific Ocean, particularly in winter months when
32 seasonal storms wash natural sand berms from the Bell Canyon Creek into the ocean
33 and water levels are higher; whereas spills within the Santa Barbara Channel and those
34 that flush out of Bell Canyon Creek are likely to flow southeast towards Devereux
35 Slough.

Venoco currently maintains several plans that deal with oil spills including a SPCC Plan, EAP, and the South Ellwood Field OSCP. The SPCC Plan includes procedures to prevent the release of oil from the facilities. The EAP details actions to occur following a spill, including directions on spill containment and logistical details such as site access, staging areas, and boat launching locations (Venoco 1998). The OSCP addresses inspection and maintenance, training and drills, notification procedures, and provides general oil spill response and cleanup techniques for various terrains, including for creeks and rivers (Venoco 2005). The OSCP also includes several appendices containing maps and listings of potentially affected sensitive resources such as plant and wildlife habitats, creeks and drainages, beaches, sloughs, marshes, etc., in the surrounding area. Implementation of the above plans would reduce impacts associated with larger oil spills.

Mitigation Measures

In addition to the implementation of MMs described in Section 4.2, Safety, the following MMs would apply:

MM WQ-3a. Pipeline Monitoring. In addition to the installed safety measures on the pipeline (e.g., low-pressure alarm system and automatic shut-in), Venoco staff shall conduct regular visual monitoring of the access road above the pipeline and soils adjacent to the access road. Staff shall inspect for obvious indicators of a small leak such as petroleum smells and any seepage of oil or visible sheen in soils adjacent to the roadway. If any indicators are present Venoco shall conduct further investigations to determine the source of the indicator and repair the pipeline as necessary.

MM WQ-3b. SWPPP. A site-specific SWPPP shall be prepared and submitted to the RWQCB, Central Coast Region, to prevent adverse impacts to nearby waterways associated with oil spills and contaminated storm water releases not covered under the EAP, which only applies to "significant events." This plan shall include site-specific diagrams illustrating primary surface drainage features (e.g., Bell Canyon Creek, Devereux Creek and Devereux Slough, and proposed spill containment, delineation of drainage features) and a description of BMPs, including spill containment equipment and procedures tailored for the Project site.

Rationale for Mitigation

Regular monitoring of the soils adjacent to the access road above pipeline would reveal potential pipeline damage from third party incidents or natural disasters and would help identify potential hairline fractures and leaks that may not be detected by installed leak

1 detection systems. Regular monitoring would also encourage regular maintenance of
2 the pipeline to prevent spills. Implementation of the SWPPP would minimize potential
3 impacts of small spills and contaminated storm water releases by providing site-specific
4 information and management practices regarding protection of nearby water resources.

5 Residual Impact

6 With the natural flushing processes of Bell Canyon Creek and implementation of the
7 SPCC Plan, safety measures for the pipeline, and the above MMs, impacts to surface
8 water quality in Bell Canyon Creek would be less than significant. However,
9 implementation of the OSCP, EAP, and other MMs would not reduce impacts of a large
10 oil spill to a less than significant level, particularly in Devereux Slough where insoluble
11 oil fractions could potentially be trapped in sediments for years or in creeks and
12 drainages present along the pipeline proposed between EOF and Las Flores Canyon.
13 These impacts are considered significant (Class I).

14 Impacts Related to Future Transportation Options

15 For the purposes of this analysis, it is assumed that Line 96 and the EMT would be
16 used to transport crude oil recovered from PRC 421 using the barge Jovalan to ship the
17 oil to a Los Angeles or San Francisco Bay area refinery through approximately the year
18 2013. However, as discussed earlier in this EIR (Sections 1.2.4, 2.4.2, and 3.3.6),
19 several options exist for future transportation of oil from the Project, each with different
20 potential water resources impacts. These include ongoing use of the EMT through
21 2013, use of a pipeline to Las Flores Canyon, and trucking of oil to Venoco's ROSF
22 Facility 35 miles to the south and subsequent transport to Los Angeles via pipeline. The
23 potential impacts to water resources from transportation using the existing EMT system
24 are fully described above (see Impacts WQ-2 and WQ-3).

25 However, because the timing and exact mode of transportation of produced oil after the
26 initial five years of Project operation are speculative at this point in time, the potential
27 impacts of use of a pipeline or trucking are only briefly summarized here and are fully
28 disclosed as part of the alternatives analysis (Section 4.5.5; Impact WQ-4). If neither of
29 these options is permitted or available by the cessation of operation of the EMT,
30 production from PRC 421 would be stranded, at least temporarily, until an alternative
31 transportation mode is approved and becomes available.

32 Transportation of oil through an 8.5-mile pipeline from the EOF to the AAPL at Las Flores
33 Canyon could create potentially significant impacts to water resources though

construction related impacts such as the potential for erosion, sedimentation and possible spills of drilling into area streams (see Impact WQ-4). Although the timing of construction of the new pipeline is uncertain, transportation of oil via pipeline could commence as early as 2009 or 2010, resulting in 10 or more years of transportation by pipeline. Although pipelines are generally the safest method available for the transportation of crude oil, spills could occur through accidental damage to the pipeline caused by natural (e.g., seismic activity, flooding) or man made causes (e.g., construction activity, valve failure). However, because the pipeline would be new, contain all of the most recent safety features, and would serve PRC 421 for only approximately 12 years, impacts to water resources from operation of this pipeline would be insignificant.

Future transportation of oil via a combination of trucking for 35 miles from the EOF to the ROSF and via existing pipeline south to Los Angeles would incrementally increase the potential for spills. However, under the proposed Project, trucking would commence no earlier than 2013, and would involve not more than 2 trucks per day carrying 160 barrels of oil each, declining to 1 truck per day in the later years of Project operation (see Section 3.3.6, Transportation Sub-Alternative Options, Table 3-3). Based upon the projected frequency of trucking and the distances traveled, shipment of oil via trucking would not be expected to create significant water resources impacts due to the low potential for accidents to occur. Similarly, the shipment of oil via existing pipeline which already transports substantial amounts of crude oil would not be expected to measurably increase water resources impacts as the failure rate for such pipelines is a function of pipeline length rather than increased throughput. The pipelines would not be modified by the addition of PRC 421 crude oil; therefore, the spill frequencies for the respective pipeline would be unchanged by the proposed Project.

Table 4.5-2. Summary of Water Quality and Hydrology Impacts and Mitigation Measures

Impact	Mitigation Measures
WQ-1: Temporary Construction Impacts to Marine Water Quality	HAZ-1a. Proper Personnel Training. HAZ-1b. Conduct Phase I ESA. HAZ-1c. Sediment Sampling. HAZ-1d. Removal Action Plan. WQ-1a. Silt Curtain. WQ-1b. Water Quality Certification.
WQ-2: Oil Spill Impacts to Marine Water Quality	WQ-2a. Implement MMs described in Section 4.2, Safety.
WQ-3: Oil Spill Impacts to Surface Water Quality	WQ-3a. Pipeline Monitoring. WQ-3b. Storm Water Pollution Prevention Plan.

4.5.5 Impacts of Alternatives

No Project Alternative

Under this alternative, there would be no production at PRC 421, and the facilities would eventually be decommissioned. Under the No Project Alternative, Venoco would not recommission PRC 421, and the existing wells at Pier 421 would remain shut-in and equipped with subsurface safety valves. There would be no oil production from PRC 421. This alternative would avoid the majority of impacts to water resources of Project start-up and operation. Specifics on decommissioning would be addressed in an Abandonment and Restoration Plan, and related impacts to water quality associated with that action would be evaluated at that time.

However, until PRC 421 is fully decommissioned, potentially significant impacts could occur through damage to or collapse of the caissons and seawall and subsequent releases of oil or contaminated materials into the marine environment. Such impacts would remain similar to that described in WQ-2 (see also Sections 4.2, Safety and 4.3, Hazardous Materials). Application of MM S-11, Immediate Abandonment Plan, would reduce these impacts to less than significant.

As noted in Section 2.1.1, the CSLC has concerns about the potential for pressure to build up in the reservoir, causing oil to escape from wells that were abandoned in the 1940s and 1950s. This concern is based on observations following the 1994 shut-in of the PRC 421 wells. The potential for unquantified and uncontrolled releases from previously abandoned wells is of concern, particularly because the releases would directly impact marine waters and coastal habitats. Based upon the thresholds identified in this EIR, any such release of oil into the environment could create potentially significant impacts similar to those identified in Impacts WQ-2 and WQ-3. However, insufficient data exists to quantify the actual potential for such leaks to occur, their exact location or the size of such leaks; therefore, it would be speculative to identify either the frequency or potential severity of such impacts at this time.

No Project Alternative with Pressure Testing

Under this alternative, pressure testing would be conducted over a 6- to 12-month period. No pile-driving or repairs to caissons would occur. Oil produced during pressure testing would be processed at the EOF. Therefore, potential impacts to water quality resulting from a potential spill into the ocean or release of contaminated sediments would be less than described for the proposed Project. Produced oil would

1 travel to the EOF through an existing pipeline, therefore the potential for a release into
2 onshore water resources would temporarily remain during pressure testing. Impacts
3 would be potentially significant but mitigable, and MMs WQ-1a through WQ-1d and WQ-
4 3a would be required. In addition, potential water quality impacts associated with
5 damage to or collapse of the caissons and seawall and subsequent releases of oil or
6 contaminated materials into the marine environment would remain similar to that
7 described in WQ-2 (see also Sections 4.2, Safety and 4.3 Hazardous Materials).
8 Application of MM S-11, Immediate Abandonment Plan, would reduce these impacts to
9 less than significant.

10 Onshore Separation at the EOF

11 Under this Alternative, produced oil would be transported to the EOF for separation.
12 Therefore, the potential for a release at Pier 421-2 and subsequent oil spill into the
13 ocean from Pier 421 would be reduced under this alternative. The potential for water
14 quality impacts and a spill from transport by barge Jovalan and all other impacts to
15 water quality would remain as described for the proposed Project. MMs WQ-1a through
16 WQ-1d and WQ-3a and WQ-3b would be required. Under this Alternative, Pier 421-1
17 would not be required for water re-injection and the decommissioning of Pier 421-1
18 would be accelerated. The accelerated decommissioning would require submittal of a
19 decommissioning plan for Pier 421-1 to the CSLC and the city of Goleta within
20 approximately 6 months of approval of this alternative. The decommissioning plan
21 would be subject to further environmental review.

22 Recommissioning Using Historic Production Methods

23 Under this Alternative, historic production methods involving an above-ground pump
24 and gas-fired internal combustion engine would be used to pump oil through Well 421-2.
25 Produced water and oil would be separated using a new free-water knockout system.
26 This system requires diesel fuel to operate and does not contain the same safety
27 precautions as the newer technology proposed for the Project. Therefore, the potential
28 for a release at Pier 421-2 and subsequent oil or diesel spill into the ocean may be
29 greater than the under the proposed Project. All other impacts to water quality would
30 also occur as described for the proposed Project and MMs WQ-1a through WQ-1d and
31 WQ-3a and WQ-3b would be required.

32 Re-Injection at Platform Holly

33 Under this alternative, production would resume at PRC 421 as described under the
34 proposed Project; however, water would be sent to Platform Holly, via the EOF, for re-

1 injection instead of initially using Well 421-1. Pier 421-1 would not be required for water
2 re-injection and the decommissioning of Pier 421-1 would be accelerated. The
3 accelerated decommissioning would require submittal of a decommissioning plan for
4 Pier 421-1 to the CSLC and the city of Goleta within approximately 6 months of
5 approval of this alternative, and would be subject to further environmental review.

6 Therefore the potential for a release of oil and water quality impacts would remain as
7 described for the proposed Project, and MMs WQ-1a through WQ-1d and WQ-3a and
8 WQ-3b would be required.

9 Transportation Sub-Alternative Options

10 *Pipeline Sub-Alternative*

11 Under the pipeline transportation option of the Transportation Sub-Alternatives, an 8.5
12 mile pipeline to Las Flores Canyon would be constructed for transportation of crude oil
13 produced from the proposed Project. Although the timing of construction of the new
14 pipeline is uncertain, transportation of oil via pipeline could commence as early as 2009 or
15 2010, resulting in 10 or more years of transportation by pipeline. Although pipelines are
16 generally the safest method available for the transportation of crude oil, spills could
17 potentially occur through accidental damage to the pipeline caused by natural (e.g.,
18 seismic activity, flooding) or man made causes (e.g., construction activity, valve failure).
19 However, because the pipeline would be new, contain all of the most recent safety
20 features, and would serve PRC 421 for only approximately 12 years, the likelihood of a
21 potential spill is low (see Section 4.2, Safety). Therefore, impacts to water resources
22 from operation of this pipeline are less than significant. However, as discussed below,
23 construction of such a pipeline could create short-term potentially significant impacts to
24 water resources.

25 **Impact WQ-4: Potential Impacts to Water Quality from Pipeline Construction**

26 **Water quality in creeks and drainages and associated groundwater basins along**
27 **the pipeline route could be adversely impacted by pipeline construction activities**
28 **(Potentially Significant, Class II).**

29 Impact Discussion

30 The pipeline would cross multiple intermittent and perennial creeks en route to Las
31 Flores Canyon, including perennial reaches of Tecolote, Dos Pueblos and El Capitan
32 Creeks. Pipeline construction could adversely impact water quality through increased

erosion and sedimentation related to grading within the pipeline corridor, especially where such grading occurs in coastal streams and wetlands. In addition, while the use of horizontal directional drilling (HDD) to cross major streams has clear benefits associated with avoidance of trenching across major streams, the potential for accidental releases of bentonite drilling fluid and associated additives (commonly termed “frac-out”) could create short term significant impacts to in stream water quality by substantially decreasing water quality through increased turbidity by potentially altering pH. In addition, potential “lost returns” of large amounts of such drilling fluids could create similar impacts to surface water quality if lost drilling fluids resurface. Such lost drilling fluids also have unknown potential to adversely affect shallow alluvial aquifers (Storrer Environmental Services 2003, Storrer 2007, CDFG 2007).

Mitigation Measures

MM WQ-4a. Prior to initiation of pipeline construction, Venoco shall prepare an erosion control plan to set forth BMPs to protect water quality. This plan shall be submitted to the County of Santa Barbara for review and approval. The required BMPs contained in this erosion control plan shall include, but shall not be limited to, the following measures:

- Temporary excess fill storage piles shall be covered with tarps and/or reseeded to minimize erosion and must be located to drain into detention basins with sufficient capacity to prevent sediment-laden runoff from these piles from entering creeks. Detention facilities shall be constructed prior to concurrently with pipeline construction.
- All trash shall be contained within designated areas to prevent offsite transport of loose trash and all waste bins and dumpsters shall be fitted with water-proof caps.
- Construction vehicle access and exit shall be limited to one route where possible and access points shall be stabilized with a pad of crushed rock to minimize the tracking of sediment onto public roads.
- Prior to leaving a construction site, stormwater runoff from disturbed areas shall pass through a sediment pond or other appropriate sediment removal BMP. Sediment ponds, vegetated buffer strips, sediment barriers, or other BMPs shall be constructed and functional before other land-disturbing activities take place.
- All exposed and unworked soils shall be stabilized by the application of effective BMPs. From October 1 to April 30, no soils shall remain exposed and unworked for greater than two days. From May 1 to

September 30, no soils shall remain exposed and unworked for greater than seven days.

- Soil control measures may include temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics, and the early application of gravel base on areas to be paved.
- All temporary and permanent erosion and sediment-control BMPs shall be maintained and repaired as needed to ensure continued performance of their intended function.

MM WQ-4b. Construction Storm Water Pollution Prevention Plan. A site-specific Storm Water Pollution Prevention Plan shall be prepared and submitted to the California Regional Water Quality Control Board, Central Coast Region, before the lease extension is granted, to prevent adverse impacts to nearby waterways associated with grading and erosion, frac-outs and lost returns. This plan would similarly include, but not be limited to site-specific diagrams illustrating primary surface drainage features, including all wetlands, intermittent and perennial stream crossings; delineation of drainage features; and a description of Best Management Practices, including frac-out and lost return containment equipment and procedures that are tailored for the project site. The plan shall also describe the protocol for disposing of recovered drilling fluids.

Rationale for Mitigation

Standard construction related BMPs and implementation of MMs WQ-4a and 4b in addition to MMs TBIO-3a and 3b would reduce the potential for increased erosion and sedimentation and minimize potential for frac-outs and lost returns (see also Rationale for Mitigation for Impact TBIO-3). Taken together with standard BMPs, implementation of MM WQ-4a and 4b would minimize water quality impacts associated with grading and sedimentation.

Trucking Sub-Alternative

Under this alternative, crude oil produced by the PRC wells would be transported via tanker truck from the EOF to the ROSF. There would be a maximum of five roundtrip double-tanker trucks per day, with each truck carrying approximately 160 barrels of oil. Water quality in creeks and drainages along the truck transportation route, and potentially marine waters downstream, could be adversely impacted in the event of a crude oil spill during a tanker truck accident. However, an accident involving a spill of crude oil would be of extremely low probability over the approximately 12 year life of the project and the opportunity for oil from such a spill to impact fresh or marine waters

would be remote. In addition, increased throughput in the existing pipeline between the ROSF and Los Angeles would not be expected to increase the potential for spills to occur from this existing facility. Therefore, impacts to water resources from this sub-alternative would be less than significant. See Section 4.2, Safety, for additional analysis of the potential for such a spill occurring in association with this alternative.

4.5.6 Cumulative Projects Impact Analysis

Impact WQ-5: Cumulative Impacts to Marine Water Quality

Potential oil spills occurring as a result of recommissioning of PRC 421 could result in contributions to cumulative water quality impacts on the waters of the Santa Barbara Channel (Significant, Class I).

Potential oil spills occurring as a result of the proposed Project could result in contributions to cumulative water quality impacts on the waters of the Santa Barbara Channel offshore the Project site. Section 3.4, Cumulative Projects, details projects in the surrounding area that could produce impacts to marine water quality similar to those anticipated by the proposed Project.

Projects which could produce an increased risk of oil spill that could impact the same coastal areas as the proposed Project include the following (please refer to Table 3-2, Relevant Cumulative Projects):

- Cabrillo Port/BHP Billiton LNG International, Inc.;
- LNG Terminal at Platform Grace/Northern Star Natural Gas LLC;
- Carpinteria Field Redevelopment Project/Carone Petroleum Corp. and Pacific Operators Offshore Inc.;
- Paredon Project/Venoco;
- EMT EIR Lease Renewal Project;
- Ellwood Oil Development and Pipeline Project (Full Field Development)/Venoco;
- Ellwood Oil Pipeline Installation and Field Improvements, Venoco;
- Platform Grace Resumption of Oil Production; and
- Development of additional 36 offshore Federal leases.

1 The two LNG Projects (Cabrillo Port/BHP Billiton LNG International, Inc. and the LNG
2 Terminal at Platform Grace/Northern Star Natural Gas LLC) involve the use of large
3 tankers and support vessels which would introduce the risk of fuel spills into the marine
4 environment, because they have dual-fuel engines that use the boil-off LNG and oil fuel.
5 The Carpinteria Field Redevelopment, Paredon, and EMT Projects would involve
6 increased offshore/near-shore drilling and associated crude oil transportation, which
7 would also increase the risks of oil spills. The Carpinteria Field Redevelopment would
8 also result in water quality impacts from the discharge of produced water into the marine
9 environment.

10 The Ellwood Oil Development and Pipeline Project (Full Field Development)/Venoco
11 would involve increased spill risks due to offshore drilling. In combination with the
12 reactivation of PRC 421, cumulative spill risk and potential concurrent spills from both
13 projects would result in significant water quality impact. However, the Ellwood Oil
14 Development and Pipeline Project would involve abandoning the operations of the EMT.
15 This would reduce the risks of a marine oil spill and associated water quality impacts as
16 Line 96 and the EMT would no longer be used.

17 The Platform Grace Project would include a resumption of oil production and an
18 increase in vessel traffic with attendant risks of spills. Although the status of the 36
19 undeveloped Federal leases remains in litigation, development of these leases would
20 result in additional exploratory drilling, increases in vessel traffic and potential oil spills
21 to the marine environment that would have a cumulative effect alongside the proposed
22 Project. The development of the Bonita, Rocky Point, Gato Canyon, Sword, and
23 Cavern Point leases, in particular, would be most likely to overlap with the proposed
24 Project. All of these projects would exacerbate an already significant impact (Class I)
25 associated with the proposed Project's risks of spills to the marine environment.

26 Mitigation Measures

27 Each of these projects must meet regulatory requirements designed to reduce the
28 probability and consequences of accidental releases to the environment. However,
29 even the best-designed and implemented MMs, such as safe design of the facilities, oil
30 spill contingency plans, training and drills, and availability of oil spill cleanup means,
31 cannot eliminate all risk of an oil spill.

1 Rationale for Mitigation

- 2 Implementing regulatory requirements with industry BMPs can lower the risk and
3 consequences of an accidental oil spill.

4 Residual Impact

- 5 The proposed Project's contribution to cumulative projects would remain significant.